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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 10/711,717  | 09/30/2004  | Hideaki Yamasaki     | RAJ-025             | 5716             |
| 37694   | 7590        | 03/22/2006           | EXAMINER            |                  |
| WOOD, HERRON & EVANS, LLP (TOKYO ELECTRON)<br>2700 CAREW TOWER<br>441 VINE STREET<br>CINCINNATI, OH 45202 |             |                      | CHEN, BRET P        |                  |
|   |             | ART UNIT             |                     | PAPER NUMBER     |
|   |             | 1762                 |                     |                  |

DATE MAILED: 03/22/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                            |                         |  |
|------------------------------|----------------------------|-------------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b>     | <b>Applicant(s)</b>     |  |
|                              | 10/711,717                 | YAMASAKI ET AL.         |  |
|                              | <b>Examiner</b><br>B. Chen | <b>Art Unit</b><br>1762 |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 30 December 2005.
- 2a) This action is FINAL.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1,8-19 and 21-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1,8-19 and 21-23 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All    b) Some \* c) None of:
1. Certified copies of the priority documents have been received.
  2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) Notice of Informal Patent Application (PTO-152)
- 6) Other: \_\_\_\_\_.

## **DETAILED ACTION**

Claims 1, 8-19, 21-23 are pending in this application. Amended claims 1, 8, 10-19; canceled claims 2-7, 20; and newly added claims 21-23 are noted.

### ***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

**Claims 1, 8-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iizuka et al. (6,596,602) in view of West (5,577,263).** Iizuka discloses a method of fabricating a high dielectric constant metal oxide insulating film in a semiconductor device (col.3 lines 30-43) in which a barrier insulator layer 34 is formed on the surface of a lower electrode 33 (col.10 lines 4-6) which is formed on the inner side of capacitance hole 32 (col.9 lines 1-7). The lower electrode can be rhenium and deposited by ALCVD and the barrier insulator layer can be SiON (col.10 lines 16-35). A host of materials is disclosed (col.5 lines 46-56). However, the reference remains silent on how the rhenium film is formed.

West discloses a chemical vapor deposition method for depositing a rhenium metal layer on a carbon substrate by reducing rhenium hexafluoride (col.1 lines 8-14). In one embodiment, rhenium carbonyl can be the precursor if carbon contamination is not of concern (col.1 line 54 – col.2 line 16). It would have been obvious to one skilled in the art to utilize West's process of forming rhenium in the process of Iizuka with the expectation of obtaining similar results.

In claim 8, the applicant requires an annealing step. It is noted that Iizuka teaches that oxygen depletion occurs because of a heat treatment step and thus recommends its avoidance.

However, one skilled in the art after reading Iizuka would realize that if one was not concerned about oxygen depletion, a heat treatment step can be utilized. It would have been obvious to utilize an annealing step in Iizuka's process because of the reasons indicated. The same issue applies to claim 12.

In claim 9, the applicant requires specific precursors. It is noted that in CVD, many different precursors can be utilized to form specific materials. A precursor is often chosen because of its cost and its desired effects. To select the claimed precursor would have been obvious in routine experimentation with the expectation of obtaining the same material with specific characteristics appropo for the desired final product. The same issue is applied to claim 11.

In claim 10, the applicant requires the passivation layer to be a silicide, a carbide, an oxide, or a boride layer. This limitation is met in col.10 lines 36-44.

Woodruff et al. (5,169,685) discloses a method for forming non-columnar deposits by chemical vapor deposition in which a metal such as rhenium is utilized in semiconductor manufacturing (col.5 lines 1-30) wherein a rhenium coating is deposited on a graphite substrate as a diffusion barrier followed by a tungsten or mixed tungsten-rhenium layer (col.11 lines 19-30).

Tuffias et al. (5,780, 157) discloses a method of forming a refractory metal layer such as rhenium 22 followed by a carbide layer 28 (col.9 lines 40-67).

***Allowable Subject Matter***

Claims 15-19, 21-23 are allowed.

***Double Patenting***

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

**Claims 1, 8-19, 21-23 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-25 of U.S. Patent No. 6,921,711 for the reasons listed in the previous office action.**

***Response to Arguments***

Applicant's arguments filed 12/30/05 have been fully considered but they are not persuasive.

Applicant argues that the double patenting rejection cannot stand because the reference fails to teach a silicon and carbon-containing layer on a rhenium layer (p.11)

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The examiner disagrees. Cabral specifically teaches a gate structure in which a first layer can be rhenium and the second layer can be a silicide. It is the examiner's position that this meets the limitation of the instant claims.

Applicant next argues that the double patenting rejection cannot stand because the reference fails to teach a conversion of a surface portion of a rhenium metal layer to a silicide, carbide, oxide, or boride. (p.11).

The examiner agrees in part. However, it is noted that nowhere in instant claim 8 is there any recitation of converting a rhenium surface to another material. Hence, the applicant's arguments are not commensurate in scope with the instant claims. Furthermore, it appears that the conversion is inherent to an annealing process.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to B. Chen whose telephone number is (571) 272-1417. The examiner can normally be reached on 7:30am - 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Bc  
3/19/06



BRET CHEN  
PRIMARY EXAMINER